

Educational Module

Title: Data and Graph Analysis and Interpretation

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Grade Level / Subject: 7th Grade Math

Curriculum Standards (from NCTM Principles and Standards for School Mathematics Grades 6-8):

Algebra Standard:

- Represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic rules
- Relate and compare different forms of representation for a relationship

Data Analysis and Probability Standard:

- Find, use, and interpret measures of center and spread, including mean and interquartile range
- Discuss and understand the correspondence between data sets and their graphical representations, especially histograms, stem-and-leaf plots, box plots, and scatterplots
- Use observations about differences between two or more samples to make conjectures about the populations from which the samples were taken

Problem Solving Standard:

- Build new mathematical knowledge through problem solving
- Solve problems that arise in mathematics and in other contexts
- Apply and adapt a variety of appropriate strategies to solve problems
- Monitor and reflect on the process of mathematical problem solving

Communication Standard:

- Organize and consolidate their mathematical thinking through communication
- Communicate their mathematical thinking coherently and clearly to peers, teachers, and others
- Analyze and evaluate the mathematical thinking and strategies of others
- Use the language of mathematics to express mathematical ideas precisely

Connections Standard:

- Recognize and use connections among mathematical ideas
- Recognize and apply mathematics in contexts outside of mathematics

Representation Standard:

- Use representations to model and interpret physical, social, and mathematical phenomena

Overview: Students will compare data and graphs and will analyze the data presented in graphical format.

Purpose: The graphical representation of data and the interpretation of data represented in a graphical format are life skills. Much of the information that students see on the news or in the newspaper that relates to statistics is presented in this format. Students need to be able to understand this format of receiving information.

Learning Objectives: At the end of this lesson, students will be able to:

- Accurately title and label a graph
- Determine which graph represents which data set
- Determine the type of graph which most accurately and clearly shows a data set
- Compare data given by different graphs and make conjectures based upon their observations
- Use graphs to obtain further information about a data set
- Apply information received from a graph to real world situations

Vocabulary:

- Matrix
- X-Axis
- Y-Axis
- Average and/or Mean
- Range
- Bar Graph
- Line Graph
- Multiple Bar Graph
- Multiple Line Graph
- Scatterplot
- Legend or Key

Resources & Materials: Weather data was obtained at:

<http://cdiac.esd.ornl.gov/r3d/ushcn/statemean.html>

For the day one activity, each student or group of students will need:

- One copy of the Data Matching Activity sheet (4 pages)
- One copy of the Data Matching Rubric

For the day two activity, each student or group of students will need:

- One copy of the Weather Graphs assignment (3 pages)
- One copy of the Weather Graphs rubric

The teacher will need:

- One copy of the weather data to use as a key and/or to share with students at the end of the activity so they can compare their results to the actual data

Preparatory Activities & Prerequisite Knowledge:

- Students will need to know how to calculate the mean (average) of a set of numbers
- Students will need to know how to calculate the range of a set of numbers
- Students will need to know the meaning of Latitude and Longitude
- Students will need to have a relative knowledge of the geography of the United States
- Students will need a basic knowledge of how to read a bar graphs, line graphs, and scatterplots

Main Activities:

*****This lesson is designed around two 90 minute block periods. It could be condensed into two 45 minute class periods with homework time depending on the level of group work.*****

Day One: Data Matching Activity

- 1) (TIME: 30 minutes) Give each student a copy of the Data Matching Activity and Data Matching Rubric. Have students work independently on completing the matching and the corresponding questions. Tell students that if they are stuck on a question to either make their best guess, or skip it and go on.
- 2) (TIME: 30 minutes) Arrange students into groups of about 3 or 4. Each group has two tasks to complete. First, have the groups discuss the results that they came up with for the Data Matching Activity. Groups should try to reach a consensus about solutions and each group member should share their observations and conjectures. This leads to the group's second task, which is to be ready to present and share their findings about the activity with the entire class.
- 3) (TIME: 30 minutes) As a large group, facilitate a discussion about the Data Matching Activity. Possible key points to hit are:
 - Accurate titles and axes labels for the graphs
 - Have groups present how they achieved their solutions for different questions
 - Have students share and discuss responses to questions 4, 5, and 6
 - Have students discuss whether or not the data presented seems realistic
 - Have students discuss whether or not a different type of graph (one not already shown) would have been a more effective way to represent the data
- 4) Possible Homework Activities or Extensions:
 - Have students find examples of graphs in the newspaper and write a summary of what information they can gather from the graph
 - Have students make a chart and graph of their G.P.A for all of the quarters of middle school which they have completed
 - Have students use the data given to create a different form of graph
 - Have students calculate the mean, median, mode, and range for the data sets given

Day Two: Weather Graphs Activity

- 1) (TIME: 30 minutes) Give each student a copy of the first two pages of the Weather Graphs Activity. Have students work in groups of 3 or 4. Have the groups determine which graph shows which city's weather pattern and justify their answers. Each student is responsible for recording their solutions on their own paper.
- 2) (TIME: 20-30 minutes) Have each group present their findings and share their reasoning with the rest of the class. Then facilitate a discussion around any differences in the solutions that groups may have. You may want to have groups write their findings and reasoning on a sheet of butcher paper or on a transparency

to make presenting easier and to help groups to be more organized. At the end of this time, you may want to share which graph is which city or you can wait until later to do this.

- 3) (TIME: 30-40 minutes) Give each student a copy of the final page of the Weather Graphs Activity and the Weather Graphs Activity Rubric. Have students complete this page. Students can work individually, with a partner, or with a group depending on the level of independence you wish. Remind students that even though part of the work was done as a group, the rubric applies to the work they have written on their paper.

4) Possible Homework Activities or Extensions:

- Have students find examples of graphs in the newspaper or in a magazine and write a summary of what information they can gather from the graph
- Have students make a chart and graph of their G.P.A for all of the quarters of middle school which they have completed
- Have students use the data given to create a different form of graph
- Have students calculate the mean, median, mode, and range for the data sets given
- Have students collect data about how they spend their time for a week. Have them turn the data into a matrix chart and then graph the data. Students could also write a brief rationale for why the graph they chose represents the data in the most clear and accurate way.
- Have the students collect data and make two graphs comparing how they spend their time during the week versus how they spend their time on the weekend.
- Have students make a matrix chart using human ratios. Students will either need to work in a group to get measurements for several students, or can measure family members for homework. Students need to calculate the ratios, put the ratio into decimal form, make them into a chart, and then graph the data. Possible ratios to examine are:
 - neck/knee (should be about 1)
 - height/arm span (should be about 1)
 - forearm/foot (should be about 1)
 - top of head to waist / waist to feet (should be the Golden Ratio)
 - top of head to eyes / eyes to chin (should be the Golden Ratio)
 - tip of finger to first knuckle / first knuckle to second knuckle (should be the Golden Ratio)

Name: _____
Class: _____

DATA MATCHING ACTIVITY

DIRECTIONS: Match each of the following sets of data to the appropriate graph. Then title and label the axes for each of the graphs based upon the data set you matched with it.

DATA SETS:

SUMMER JOBS FOR ONE WEEK IN JUNE:

	MOWING LAWNS	BABYSITTING	PETCARE	DAILY EARNINGS
SUNDAY	\$10.00	\$10.00	\$15.00	\$35.00
MONDAY	\$30.00	\$15.00	\$15.00	\$60.00
TUESDAY	\$20.00	\$10.00	\$15.00	\$45.00
WEDNESDAY	\$5.00	\$40.00	\$10.00	\$55.00
THURSDAY	\$40.00	\$5.00	\$10.00	\$55.00
FRIDAY	\$20.00	\$35.00	\$5.00	\$60.00
SATURDAY	\$40.00	\$20.00	\$5.00	\$65.00

SUMMER JOBS FOR ONE WEEK IN JULY:

	MOWING LAWNS	BABYSITTING	PETCARE	DAILY EARNINGS
SUNDAY	\$35.00	\$15.00	\$5.00	\$55.00
MONDAY	\$20.00	\$10.00	\$10.00	\$40.00
TUESDAY	\$30.00	\$15.00	\$10.00	\$55.00
WEDNESDAY	\$15.00	\$25.00	\$10.00	\$50.00
THURSDAY	\$35.00	\$15.00	\$5.00	\$55.00
FRIDAY	\$35.00	\$20.00	\$10.00	\$65.00
SATURDAY	\$45.00	\$15.00	\$10.00	\$70.00

SUMMER JOBS FOR ONE WEEK IN AUGUST:

	MOWING LAWNS	BABYSITTING	PETCARE	DAILY EARNINGS
SUNDAY	\$15.00	\$35.00	\$5.00	\$55.00
MONDAY	\$20.00	\$15.00	\$10.00	\$45.00
TUESDAY	\$25.00	\$20.00	\$5.00	\$50.00
WEDNESDAY	\$15.00	\$30.00	\$10.00	\$55.00
THURSDAY	\$65.00	\$15.00	\$10.00	\$90.00
FRIDAY	\$60.00	\$25.00	\$10.00	\$95.00
SATURDAY	\$45.00	\$15.00	\$15.00	\$75.00

GRADES FOR SIXTH GRADE (A+, A, A-=4.0; B+, B, B-=3.0; C+, C, C-=2.0; D+, D, D-=1.0, F=0.0):

	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER
SOCIAL STUDIES	3.00	3.00	3.00	3.00
LANGUAGE ARTS	3.00	2.00	4.00	3.00
SCIENCE	2.00	3.00	4.00	2.00
MATH	2.00	3.00	2.00	3.00
ELECTIVE1	3.00	3.00	4.00	3.00
ELECTIVE 2	2.00	4.00	2.00	3.00
ENRICHMENT	3.00	4.00	3.00	3.00

GRADES FOR SEVENTH GRADE (A+, A, A-=4.0; B+, B, B-=3.0; C+, C, C-=2.0; D+, D, D-=1.0, F=0.0):

	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER
SOCIAL STUDIES	4.00	3.00	2.00	4.00
LANGUAGE ARTS	3.00	4.00	3.00	4.00
SCIENCE	3.00	3.00	4.00	3.00
MATH	4.00	3.00	4.00	3.00
ELECTIVE1	4.00	3.00	4.00	3.00
ELECTIVE 2	2.00	4.00	3.00	3.00
ENRICHMENT	3.00	4.00	3.00	3.00

GRADES FOR EIGHTH GRADE (A+, A, A-=4.0; B+, B, B-=3.0; C+, C, C-=2.0; D+, D, D-=1.0, F=0.0):

	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER
SOCIAL STUDIES	2.00	2.00	3.00	4.00
LANGUAGE ARTS	1.00	2.00	2.00	3.00
SCIENCE	2.00	1.00	3.00	3.00
MATH	2.00	2.00	1.00	4.00
ELECTIVE1	2.00	1.00	3.00	3.00
ELECTIVE 2	1.00	1.00	3.00	4.00
ENRICHMENT	2.00	2.00	2.00	3.00

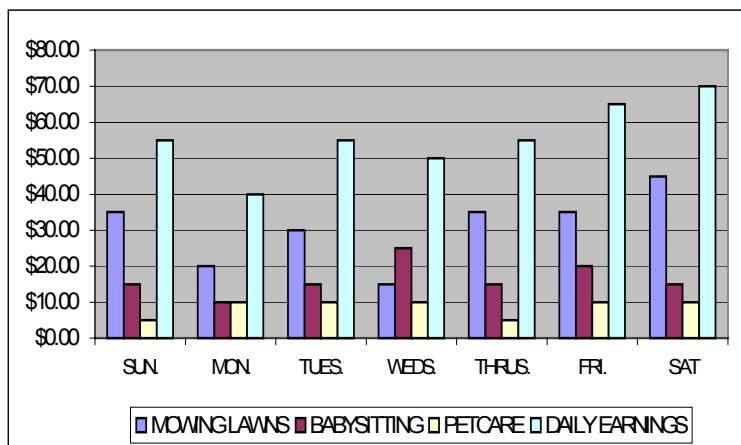
GRAPHS:

GRAPH A

Title: _____

X-Axis: _____

Y-Axis: _____

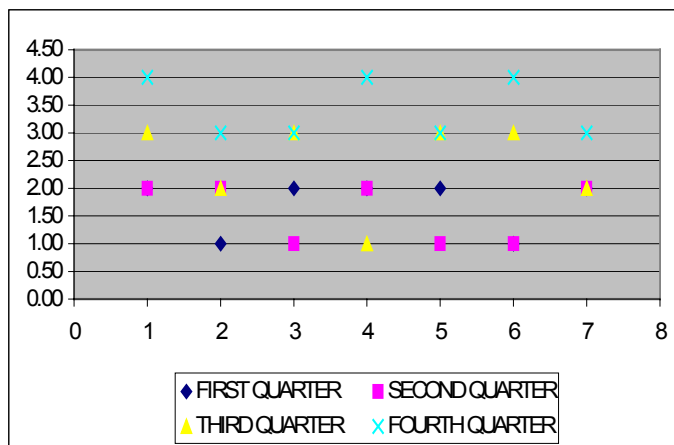


GRAPH B

Title: _____

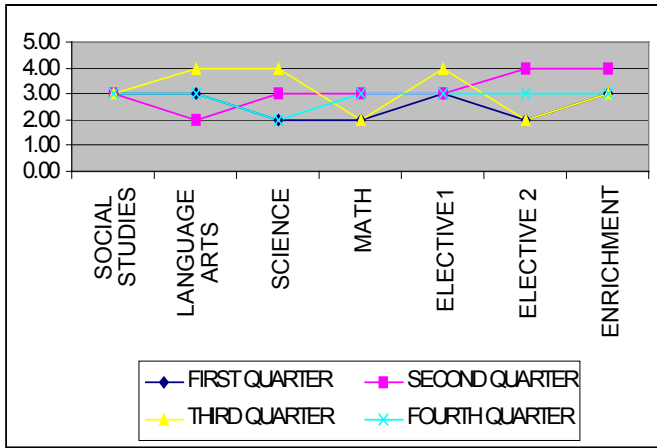
X-Axis: _____

Y-Axis: _____



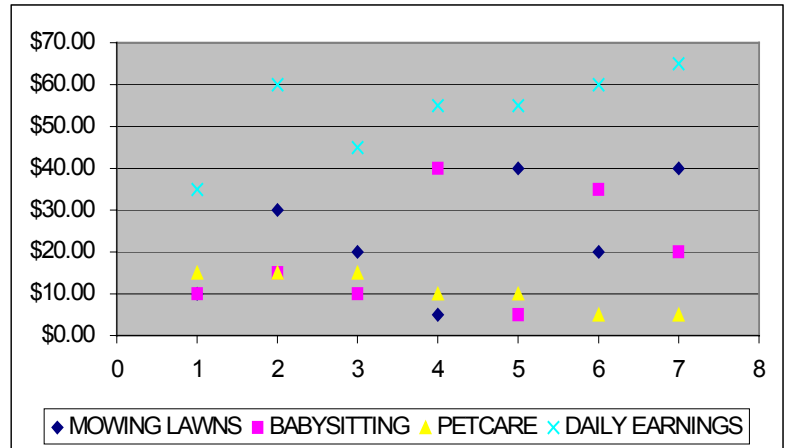
GRAPH C

Title: _____
 X-Axis: _____
 Y-Axis: _____



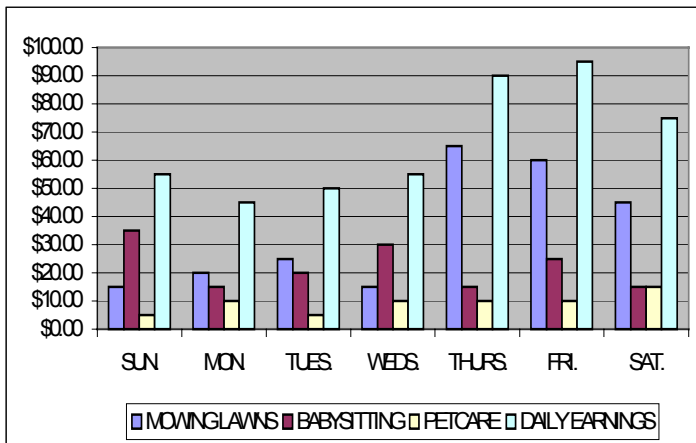
GRAPH D

Title: _____
 X-Axis: _____
 Y-Axis: _____



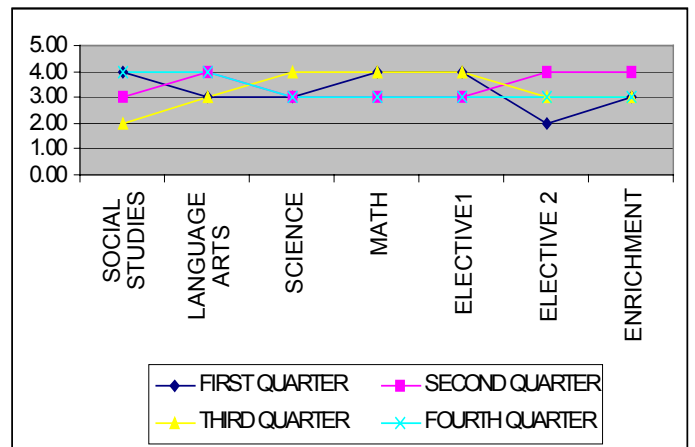
GRAPH E

Title: _____
 X-Axis: _____
 Y-Axis: _____



GRAPH F

Title: _____
 X-Axis: _____
 Y-Axis: _____



QUESTIONS:

DIRECTIONS: Answer each of the following questions. Make sure to show all mathematical calculations and support all of your answers.

- 1) Of the six graphs shown, please explain which one do you feel shows the data in the most clear and accurate way?

- 2) Assume the data sets for the summer job in June, July, and August represent an average week's earnings for each of these months.
- a) What is the average amount of money this person made per week over the course of the summer?
 - b) If this person were out of school for 10 weeks, how much money would they have made over the course of the summer?
 - c) How much money per day did this person average?
- 3) What was this person's average G.P.A. for each of the three years they were in middle school? What was his/her cumulative (average for all three years) G.P.A.?
- 6th Grade: _____
- 7th Grade: _____
- 8th Grade: _____
- Cumulative: _____
- 4) As you compare the G.P.A. over the course of the three years, what conclusions can you make about how this student performed?
- 5) Using your conclusions from number 4, what impacts did this student's performance make on the cumulative G.P.A.?
- 6) Sketch a graph to represent the cumulative G.P.A. for this student. Please give your graph a title and label the axes.

DATA MATCHING RUBRIC

ADVANCED:

- Titles for graphs are exceptionally clear and quickly let the reader know what the graph is about
- Labels for axes are exceptionally clear and quickly let the reader know what the graph is about
- Conclusions and solutions are clearly supported in a logical manner and, where possible, more than one possible conclusion or solution is presented
- Mathematical calculations are correctly done in a logical and sequential format
- Student communicates clear and logical reasoning and thoroughly supports all conclusions and solutions

PROFICIENT:

- Titles for graphs are clear and accurate
- Labels for axes are clear and accurate
- Conclusions and solutions are supported in a logical manner
- Mathematical calculations are correctly done
- Student communicates reasoning in an effective manner

PARTIALLY PROFICIENT:

- Titles for graphs are vague and do not clearly tell the reader what the graph is about
- Labels for axes are vague and do not clearly tell the reader what each axis measures
- Conclusions and solutions are given but are not clearly supported or are difficult to follow
- Mathematical calculations have slight mistakes
- Student communicates some reasoning

UNSATISFACTORY:

- Titles are incorrect, missing, or give the reader no understanding of what the graph is about
- Labels for axes are incorrect, missing, or give the reader no understanding of what the graph is about
- Conclusions and solutions are not given or have no support
- Mathematical calculations are incorrect or missing
- Student does not communicate reasoning

Name: _____
Class: _____

Weather Graphs

Directions: You are given eight different graphs that show the average monthly temperatures for five different years. Each graph represents a different city. Your job is to figure out which graph goes with which city. After you have completed this, answer the questions at the end. Be prepared to present your findings. The cities you have to choose from are:

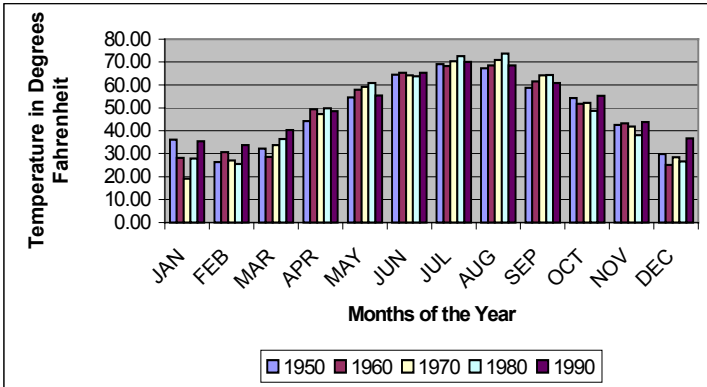
Boulder, Colorado
Aurora, Illinois

New York, New York
Key West, Florida

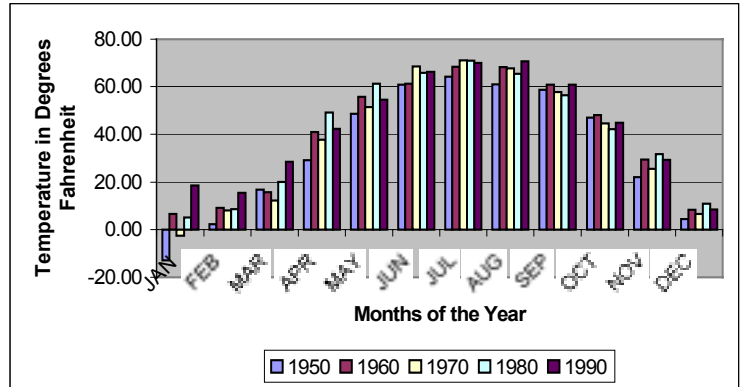
Reno, Nevada
Williamsburg, Virginia

Pasadena, California
Grand Forks, North Dakota

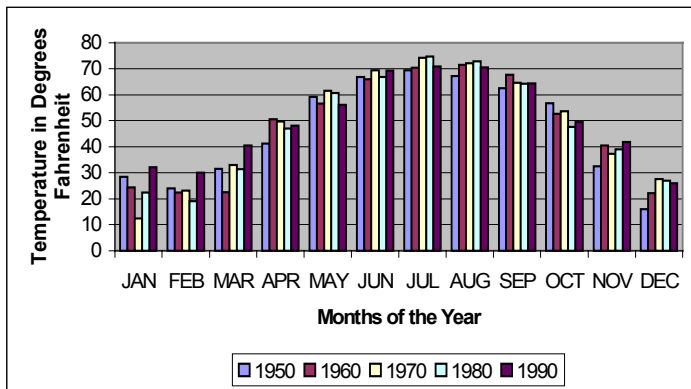
Graph 1: City _____



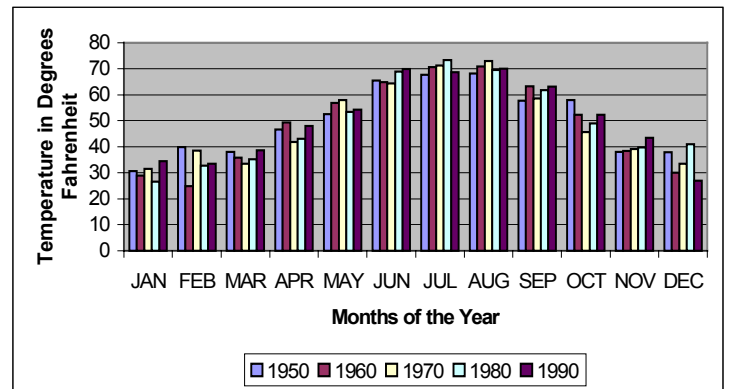
Graph 2: City _____



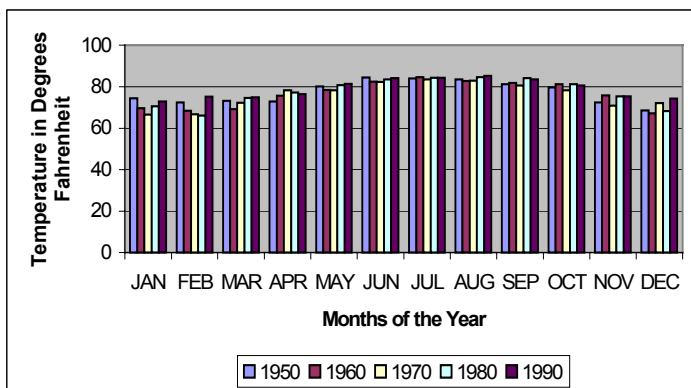
Graph 3: City _____



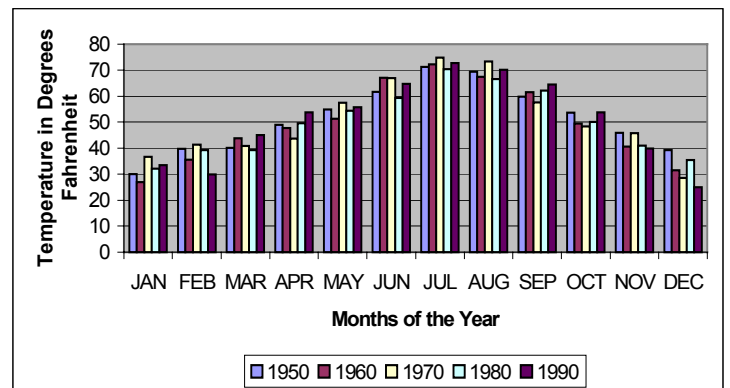
Graph 4: City _____



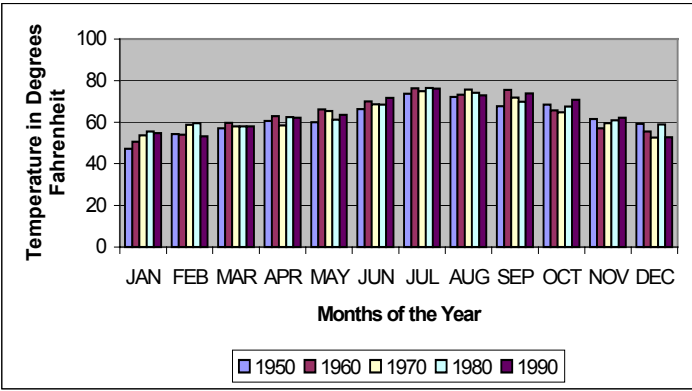
Graph 5: City _____



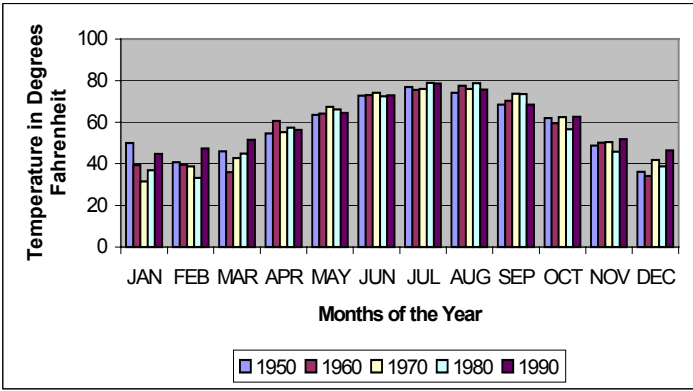
Graph 6: City _____



Graph 7: City_____



Graph 8: City_____



QUESTIONS:

1) Briefly (1-2 complete sentences) describe why you chose the graph you did for each city:

New York, New York: _____

Boulder, Colorado: _____

Pasadena, California: _____

Grand Forks, North Dakota: _____

Aurora, Illinois: _____

Reno, Nevada: _____

Key West, Florida: _____

Williamsburg, Virginia: _____

- 2) Which year of which graph shows the lowest mean temperature during the month of November? Please support your answer.
- 3) Which year of which graph shows the highest mean temperature during the month of April? Please support your answer.
- 4) Which graph shows the greatest range of temperature? Explain how you concluded this.
- 5) Which graph shows the smallest range of temperature? Explain how you concluded this.
- 6) Do you think any of these cities share the same latitude? If so, which cities. Explain your answer.
- 7) Do you think any of these cities share the same longitude? If so, which cities. Explain your answer.
- 8) Which graph has the highest mean temperature for July? Support your answer.
- 9) What information can we tell about the two cities in Graph 2 and Graph 5 as we compare these two graphs? Please make at least 5 observations or conjectures and explain each observation or conjecture in at least 1-2 complete sentences.
- 10) Draw a sketch of what you think the graph for the temperatures in Denver, Colorado looks like. Then, do the same for the temperatures in Honolulu, Hawaii. Please explain your conclusions.

WEATHER GRAPHS RUBRIC

ADVANCED:

- Student provides clear and logical support for how they matched the cities to the graphs
- Student uses knowledge of geographic locations to support observations, conclusions, and conjectures
- Mathematical calculations are correctly done in a logical and sequential format
- Student demonstrates an in-depth understanding of mean and range
- Student makes accurate and logical conjectures based on detailed analysis of the given information
- Observations and conjectures show an analytical understanding of the data and graphs provided
- Student communicates clear and logical reasoning and thoroughly supports all observations, conclusions, and conjectures

PROFICIENT:

- Student provides clear support for their choice of how they matched the cities to the graphs
- Mathematical calculations are correctly done
- Student demonstrates an understanding of mean and range
- Student makes accurate and logical conjectures based on given information
- Observations, conclusions, and conjectures show an understanding of the data and graphs provided
- Student communicates reasoning in an effective manner

PARTIALLY PROFICIENT:

- Student provides some support for their choice of how they matched the cities to the graphs
- Mathematical calculations have slight mistakes
- Student demonstrates a partial understanding of mean and range
- Student makes conjectures based on given information which are inaccurate or unclear
- Observations, conclusions, and conjectures show a partial understanding of the data and graphs provided
- Student communicates some reasoning

UNSATISFACTORY:

- Student provides no support for their choice of how they matched the cities to the graphs
- Mathematical calculations are incorrect or missing
- Student does not demonstrate an understanding of mean and range
- Student makes no conjectures based on given information
- Observations, conclusions, and conjectures show little or no understanding of the data and graphs provided
- Student does not communicate reasoning

DATA FOR NEW YORK, NEW YORK

WEBSITE: <http://cdiac.esd.ornl.gov/r3d/ushcn/statemean.html>

LATITUDE: 41N

LONGITUDE: -74W

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1950	36.18	26.38	32.16	44.26	54.56	64.44	69.14	67.24	58.80	54.20	42.60	29.78
1960	28.16	30.56	28.64	49.44	57.94	65.36	68.16	68.46	61.62	51.72	43.32	25.16
1970	19.10	27.00	33.83	47.23	59.13	64.17	70.37	70.87	64.14	52.24	41.84	28.40
1980	27.78	25.48	36.39	49.69	60.79	63.66	72.66	73.66	64.23	48.63	38.03	26.58
1990	35.38	33.78	40.21	48.61	55.31	65.35	70.05	68.55	60.82	55.22	43.72	36.58

DATA FOR RENO, NEVADA

WEBSITE: <http://cdiac.esd.ornl.gov/r3d/ushcn/statemean.html>

LATITUDE: 40N

LONGITUDE: -120W

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1950	30.02	39.72	40.07	48.87	54.87	61.64	71.24	69.34	59.79	53.69	45.89	39.32
1960	26.95	35.55	43.85	47.75	51.25	67.07	72.27	67.37	61.51	49.41	40.61	31.55
1970	36.65	41.35	40.87	43.57	57.47	66.85	74.75	73.25	57.6	48.4	45.8	28.55
1980	32.05	39.23	39.25	49.54	54.41	59.19	70.37	66.61	62.12	50.02	40.92	35.41
1990	33.41	29.91	44.98	53.78	55.68	64.7	72.7	70.1	64.41	53.71	39.91	24.91

DATA FOR BOULDER, COLORADO

WEBSITE: <http://cdiac.esd.ornl.gov/r3d/ushcn/statemean.html>

LATITUDE: 40N

LONGITUDE: -105W

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1950	30.61	39.9	38	46.59	52.46	65.44	67.72	68.13	57.67	57.86	38.06	37.93
1960	28.99	24.85	35.78	49.27	56.82	64.8	70.6	70.93	63.24	52.35	38.32	29.94
1970	31.41	38.4	33.44	41.73	57.92	64.26	71.19	72.92	58.55	45.73	39.05	33.41
1980	26.54	32.7	35.16	43.04	53.29	68.82	73.25	69.5	61.73	48.94	39.66	40.91
1990	34.45	33.35	38.63	47.97	54.29	69.86	68.68	69.93	63.05	52.26	43.4	27.01

DATA FOR GRAND FORKS, NORTH DAKOTA

WEBSITE: <http://cdiac.esd.ornl.gov/r3d/ushcn/statemean.html>

LATITUDE: 48N

LONGITUDE: -97W

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1950	-12.84	2.26	16.82	29.26	48.60	60.84	64.19	61.03	58.76	47.09	22.03	4.54
1960	6.68	9.08	15.66	40.96	55.76	61.32	68.42	68.22	60.95	48.15	29.39	8.38
1970	-2.48	8.12	12.21	37.75	51.39	68.49	71.04	67.68	57.79	44.72	25.56	6.50
1980	5.21	8.51	20.10	49.24	61.28	65.77	71.02	65.46	56.37	42.20	31.74	10.89
1990	18.49	15.49	28.49	42.33	54.57	66.25	69.90	70.74	60.96	44.89	29.33	8.47

DATA FOR KEY WEST, FLORIDA

WEBSITE: <http://cdiac.esd.ornl.gov/r3d/ushcn/statemean.html>

LATITUDE: 25N

LONGITUDE: -82W

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1950	74.48	72.38	73.13	72.93	80.13	84.54	84.04	83.64	81.3	79.6	72.3	68.58
1960	69.65	68.45	69.16	75.56	78.36	82.4	84.6	82.8	81.73	81.23	75.83	67.15
1970	66.57	66.67	72.28	78.28	78.28	82.33	83.43	82.93	80.65	78.35	70.95	72.07
1980	70.59	66.19	74.6	77.1	80.7	83.46	84.36	84.66	84.06	81.26	75.36	68.19
1990	72.89	75.19	74.75	76.35	81.45	84.05	84.35	85.25	83.46	80.56	75.26	74.29

DATA FOR WILLIAMSBURG, VIRGINIA

WEBSITE: <http://cdiac.esd.ornl.gov/r3d/ushcn/statemean.html>

LATITUDE: 37N

LONGITUDE: -77W

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1950	49.98	40.71	45.95	54.51	63.41	72.77	76.82	74.17	68.4	62.08	48.66	36.19
1960	39.3	39.48	35.93	60.63	64.14	72.94	75.4	77.47	70.3	59.37	50.13	34.17
1970	31.58	38.76	42.71	55.11	67.32	74.02	75.98	75.95	73.68	62.45	50.41	41.75
1980	36.77	33.15	44.8	57.3	66.11	72.31	78.97	78.74	73.57	56.64	45.8	38.74
1990	44.66	47.24	51.49	56.19	64.4	72.89	78.55	75.72	68.36	62.53	51.79	46.43

DATA FOR PASADENA, CALIFORNIA

WEBSITE: <http://cdiac.esd.ornl.gov/r3d/ushcn/statemean.html>

LATITUDE: 34N

LONGITUDE: -118W

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1950	47.21	54.21	56.92	60.62	59.92	66.23	73.63	72.03	67.64	68.54	61.44	59.21
1960	50.52	54.01	59.73	62.87	66.12	69.93	76.26	73.22	75.42	65.67	56.92	55.59
1970	53.63	58.62	57.93	58.37	65.32	68.63	74.76	75.52	71.83	64.78	59.53	52.6
1980	55.41	59.6	58.02	62.46	61.11	68.52	76.45	74.21	69.71	67.46	60.81	58.88
1990	54.68	53.27	58	62.14	63.59	71.58	76.11	72.87	73.78	70.63	62.18	52.75

DATA FOR AURORA, ILLINOIS

WEBSITE: <http://cdiac.esd.ornl.gov/r3d/ushcn/statemean.html>

LATITUDE: 42N

LONGITUDE: -88W

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1950	28.43	23.93	31.55	41.21	59.08	66.79	69.38	67.19	62.45	56.78	32.43	16.01
1960	24.28	22.48	22.51	50.57	56.54	65.94	70.43	71.54	67.6	52.63	40.38	22.16
1970	12.45	23.15	32.99	49.75	61.52	69.4	74.19	72	64.63	53.66	37.21	27.63
1980	22.31	19.04	31.33	46.95	60.67	66.8	74.6	72.9	64.21	47.61	39.01	26.87
1990	32.02	30.02	40.37	48.09	56.13	69.25	70.75	70.45	64.25	49.45	41.85	25.92